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4	3	6266693.URPN.	USPAT	2003/12/20 15:00
5	11	("4477901"   "5323393"   "5353399"   "5537550"   "5647056"   "5727135"   "5819015"   "5862404"   "6067407"   "6108492"   "6138150").PN.	USPAT	2003/12/20 15:04
6	8	6108492.URPN.	USPAT	2003/12/20 15:08
7	25	("4186299"   "4583834"   "5057866"   "5077582"   "5084875"   "5184179"   "5214772"   "5227121"   "5265131"   "5267278"   "5271045"   "5305055"   "5333286"   "5353399"   "5361265"   "5365310"   "5384622"   "5440301"   "5446672"   "5485142"   "5491473"   "5493287"   "5502543"   "5521848"   "5537626").PN.	USPAT	2003/12/20 15:12
8	4235	digital adj (printer or copier)	USPAT; US-PGPUB	2003/12/20 16:34
9	1	(digital adj (printer or copier) ) and (cost near allocation)	USPAT; US-PGPUB	2003/12/20 16:35
10	5	(digital adj (printer or copier) ) and (cost near page)	USPAT; US-PGPUB	2003/12/20 16:49
11	16	5636032.URPN.	USPAT	2003/12/20 16:39
12	2893	(digital adj (printer or copier) ) and (cost or charge or pay or bill)	USPAT; US-PGPUB	2003/12/20 16:50
13	350	((digital adj (printer or copier) ) and (cost or charge or pay or bill)) and (per near page)	USPAT; US-PGPUB	2003/12/20 16:50
14	40	((digital adj (printer or copier) ) and (cost or charge or pay or bill)) and (per near page)) and incur\$3	USPAT; US-PGPUB	2003/12/20 16:51
15	8	disbursement near track\$3	USPAT; US-PGPUB	2003/12/20 17:11
16	35	disbursement with track\$3	USPAT; US-PGPUB	2003/12/20 17:35
17	7	(digital adj (printer or copier) ) and (disbursement)	USPAT; US-PGPUB	2003/12/20 17:35
18	0	6526391.URPN.	USPAT	2003/12/20 17:44
19	44	("4180856"   "4376299"   "4376981"   "4423287"   "4556944"   "4567359"   "4578530"   "4725718"   "4757537"   "4775246"   "4802218"   "4812994"   "4831555"   "4873645"   "4873646"   "4936209"   "5128988"   "5146403"   "5163098"   "5191533"   "5239168"   "5257196"   "5319562"   "5410598"   "5454038"   "5491796"   "5510992"   "5526428"   "5590198"   "5625694"   "5680463"   "5699258"   "5781438"   "5812401"   "5812666"   "5812991"   "5822739"   "5826247"   "5943658"   "6005945"   "6061670"   "6085181"   "6249777"   "6295359").PN.	USPAT	2003/12/20 17:44
20	296	printer with cost with page	USPAT; US-PGPUB	2003/12/20 20:16
21	132	(printer with cost with page) and document	USPAT; US-PGPUB	2003/12/20 18:48
22	132	((printer with cost with page) and document) and cost	USPAT; US-PGPUB	2003/12/20 20:16
23	16	((printer with cost with page) and document) and cost ) and tracking	USPAT; US-PGPUB	2003/12/20 20:17

DOCUMENT-IDENTIFIER: US 20030137685 A1

TITLE: HARD COPY COST RECOVERY SYSTEMS, AN  
APPARATUS FOR  
HARD COPY DEVICE, HARD TRACKING USAGE INFORMATION FOR A  
COPY DEVICES, AND A USAGE ACCOUNTING  
METHOD

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Abstract Paragraph - ABTX (1):

An apparatus for tracking usage information for an image forming device is provided which includes an image forming device, processing circuitry and memory. The processing circuitry is associated with the image forming device and is operative to detect consumable usage information at the image forming device. The memory is coupled with the processing circuitry and is operative to store a data file containing the user information, the output job information, and the usage information. A method is also provided.

Title - TTL (1):

HARD COPY COST RECOVERY SYSTEMS, AN APPARATUS FOR  
TRACKING USAGE  
INFORMATION FOR A HARD COPY DEVICE, HARD COPY DEVICES, AND  
A USAGE ACCOUNTING  
METHOD

Summary of Invention Paragraph - BSTX (4):

[0002] Prior solutions exist for tracking copy jobs requested at a hard copy device. Typically, these solutions are referred to generally as cost recovery systems. One such system is sold by Equitrac Corporation, 836 Ponce de Leon

Blvd., Coral Gables, Fla. 33134, and includes a DCT control terminal, Printlog software, and a transaction server. Such system forms a cost recovery system that uses client-based software that is installed within a user's environment, typically on a client PC. Details of such system are available on the Internet at Equitrac's website, <http://www.equitrac.com>. However, there are several disadvantages of such prior art systems in that they provide incomplete information and they are costly.

Summary of Invention Paragraph - BSTX (5):

[0003] One problem with prior art cost recovery systems is that information made available tends to be insufficient to track many kinds of print jobs. For example, server-based systems offer support on a specific network protocol only, and consequently cannot track who printed print jobs that use certain other protocols. For example, Blue Lance is a server-based system that offers support only on Novell IPX and cannot track print jobs that use TCP/IP, Netbui, or Netbios protocols.

Summary of Invention Paragraph - BSTX (6):

[0004] Another problem with prior art cost recovery systems is that special software needs to be installed on the server-based hard copy device. For example, Equitrac systems require the use of Printlog software. The addition of such software complicates the system environment. Solutions like those provided by Equitrac, that require client-based software to be installed, are difficult to implement, debug, and maintain, particularly when implemented within environments that have many client PCs. For example, the difficulty of having to install software on every client in a 1,500 seat PC environment would

be enormous.

Summary of Invention Paragraph - BSTX (7):

[0005] Yet another problem with prior art cost recovery systems is that they tend to be highly inaccurate at counting paper usage, and tend to only guess at toner usage. Inaccuracies result from miscounting, counting the wrong events, guessing at toner usage, and estimating actual paper costs.

This problem tends to be the most significant factor in why prior art cost recovery systems are inadequate.

Summary of Invention Paragraph - BSTX (8):

[0006] Miscounting by prior art cost recovery systems leads to inaccuracy because present solutions that rely on client-PC software count pages that are considered as having been printed once they have been sent to the hard copy device. However, the sending of a print job to a hard copy device does not always lead to an actual print job being realized on the hard copy device. For example, where the hard copy device is a laser printer, and if the printer jams, a server print queue gets reset, and/or a proof and hold job is cancelled, the pages in the print job are counted even though they are not printed. However, no such print job has actually occurred, which means that the number of pages that has been counted is inaccurate.

Summary of Invention Paragraph - BSTX (9):

[0007] Counting the wrong event occurs when counting is carried out at the wrong location by prior art cost recovery systems. Inaccuracy results because count data representing the number of pages sent in a print job is taken from the wrong place in the print process. The best place to count hard copy pages

that have been printed is on the output side of a hard copy device. However, prior art techniques do not count at this location. For example, where the hard copy device is a laser printer, the count should be carried out at a more accurate location. Only by counting at a more accurate location will the system know for sure what has been printed. Prior art techniques take measurements upstream of the fuser, usually by counting the pages that are submitted for printing by a print job request. However, such measurements taken upstream from the fuser are subject to confounding by such things as PC, LAN, server, printer replenishables availability, end-users getting frustrated, power-cycling of the device, and walk-up print on demand which calls up print jobs that are stored in memory on the device (and where Equitrac is provided on a system, Equitrac cannot count such print jobs).

Summary of Invention Paragraph - BSTX (10):

[0008] Another disadvantage of prior art solutions is caused because guessing and/or overly broad averaging is implemented in order to determine the amount of toner that has been utilized. Typically, many cost recovery systems assume that toner coverage is approximately 8% of page area that is used in a print job. However, actual toner coverage can vary significantly from this rough estimate, or guess. For the few cases where toner coverage is measured, it is typically measured so infrequently that there is little or no possibility that individual users can be accurately charged for the toner usage that has occurred when submitting their individual print jobs. For example, these few systems will measure toner usage over a monthly or annual basis, or upon the renewal of a pay-per-page contract, which tends to happen infrequently.

Summary of Invention Paragraph - BSTX (11):

[0009] Yet another disadvantage of prior art solutions is caused when rounding and overly broad averaging is utilized in order to estimate paper usage or cost. Present cost recovery systems count "clicks" utilizing a simple electromechanical counter that is affixed to the hard copy output device. For example, a relatively simple electromechanical counter is provided on many copy machines. Such electromechanical counter device is similar to a car odometer which increments one unit for each page that is output by the device. Typically, letter size paper and legal size paper are each counted as one "click". Ledger size is typically counted as two "clicks".

However, this does not make the paper usage cost proportional to the actual usage. For example, legal size paper will utilize more paper than the letter size page, and will incur greater costs proportionately thereto. Accordingly, utilization of simple electromechanical counter devices on a hard copy output device only roughly estimates paper costs. Accordingly, customers are charged one "click", two "clicks", or four "clicks" per impression, rather than in more accurate mathematical proportion to the paper that is actually used.

As a result, the methodology of rounding the number of "clicks" makes tracking paper costs easier to understand, but also makes such tracking inaccurate. Hence, there exists a need to provide an improved cost recovery system capable of monitoring paper usage more accurately.

Summary of Invention Paragraph - BSTX (13):

[0010] This invention is an apparatus and a method to automatically capture

hard copy cost information that is a natural, accurate, and expressively powerful way to take advantage of Applicant's hard copy LAN infrastructure.

Summary of Invention Paragraph - BSTX (14):

[0011] According to one aspect, an apparatus for tracking usage information for an image forming device includes an image forming device, processing circuitry and memory. The processing circuitry is associated with the image forming device and is operative to detect consumable usage information at the image forming device. The memory is coupled with the processing circuitry and is operative to store a data file containing the user information, the output job information, and the usage information.

Summary of Invention Paragraph - BSTX (18):

[0015] Another advantage results because output job costs can be tracked with greater precision.

Summary of Invention Paragraph - BSTX (19):

[0016] Yet another advantage results because cost information is piggybacked on a local area network (LAN) which eliminates the need for secondary communications links, and reduces the likelihood that the invention will be tricked into miscounting by packet sniffing.

Brief Description of Drawings Paragraph - DRTX (3):

[0020] FIG. 1 is a block diagram of a computer system that includes a local area network (LAN), multiple client personal computers (PCs), an image forming device in the form of a hard copy output device, and a walk-up copy user, wherein a hard copy cost recovery system is provided pursuant to Applicant's invention.

Brief Description of Drawings Paragraph - DRTX (4):

[0021] FIG. 2 is a block diagram illustrating in greater detail the hard copy cost recovery system of Applicant's invention.

Brief Description of Drawings Paragraph - DRTX (5):

[0022] FIG. 3 is a process flow diagram showing part of the logic processing for sequestering and/or polling output job information in order to realize hard copy cost recovery over a local area network (LAN).

Detail Description Paragraph - DETX (3):

[0024] FIG. 1 schematically illustrates in block diagram form the architecture of a hard-copy cost recovery system 10, which implements a preferred embodiment of the present invention. In one embodiment, hard-copy cost recovery system 10 is a tracking apparatus for monitoring usage of consumables that is implemented on an image forming device 12 within a local area network (LAN) environment 14. According to one construction, image forming device 12 comprises a hard copy output device. For purposes of this disclosure, the phrase "hard copy output device" is considered to be the equivalent of "hard copy device". One form of a hard copy device comprises a multiple-function peripheral (MFP) device that includes printer functionality.

Detail Description Paragraph - DETX (6):

[0027] According to one implementation of tracking apparatus 10 in FIG. 1, a walk-up copy user 30 is able to deliver a print job request to image forming device 12 either directly via a user interface 31 (see FIG. 2), or by way of client PC 18. Accordingly, tracking apparatus 10 is able



to accurately collect usage information for consumables utilized to generate a print job with the image forming device 12. More particularly, as discussed below, consumable usage information includes total page area and toner used to cover the page area. Accordingly, determinations can be made as to the cost of the consumable resources that are utilized for any particular print job. Such usage information then enables proper allocation of costs to specific print jobs, which better enables a user to track costs for consumable usage and distribute such costs between particular print jobs and/or customers who have requested generation of such print jobs via LAN environment 14.

Detail Description Paragraph - DETX (7):

[0028] One exemplary application for tracking apparatus 10 of FIG. 1 involves the provision of LAN environment 14 within a law firm. A law firm application typically requires the generation of a number of different print jobs for specific individual clients. It may be desirable for a user to track the actual usage information for specific print jobs so that the costs for paper usage and toner usage can be properly allocated and billed to such clients, or customers.

Detail Description Paragraph - DETX (8):

[0029] In order to realize tracking apparatus 10, specific information is collected by image forming device 12 which describes toner coverage and paper used by the image forming device when generating individual pages and/or print jobs. Such methodology involves trapping toner coverage and paper-used information at the image forming device 12 in the form of data which allows the

data to be collected where it can be evaluated and/or retrieved by LAN 16 and/or any device connected to LAN 16. More particularly, four kinds of information are collected and/or co-located within image forming device 12: (1) the location where costs have been incurred; (2) the job/page complete validation information; (3) consumables cost information; and (4) information describing print jobs including who generated the print job, from where the print job was generated, and when the print job was generated.

Detail Description Paragraph - DETX (9):

[0030] FIG. 2 illustrates in greater detail the apparatus and method of Applicant's invention. More particularly, FIG. 2 illustrates image forming device 12 which in one embodiment comprises a printer in the form of an MFP 24. Tracking apparatus 10 enables specific determination of where costs have been incurred simply by determining which image forming device 12 has fused toner onto one or more sheets of paper. Such information is collected by processing circuitry 38 which is provided by image forming device 12.

Detail Description Paragraph - DETX (10):

[0031] Job/page complete validation information is determined by tracking apparatus 10 when image forming device 12 increases page counts via processing circuitry 38. According to one construction, image forming device 12 is a printer. During generation of such print jobs, processing circuitry 38 counts the number of pages which are being delivered as output by image forming device 12. When a printing device increases page count via processing circuitry 38, it is nearly certain that such pages have been completely generated and passed through the output side of the fuser of printer 12.

Although it is not necessarily exact, the monitoring of such page counting via processing circuitry 38 is significantly more accurate than if one were to count print jobs which have been generated via a LAN 16.

Detail Description Paragraph - DETX (11):

[0032] For example, it is possible that a user delivers a print job from PC 18 comprising a large number of copies of a single document. However, a user may proofread the first copy of the print job, and subsequently cancel the remaining copies because a typographical error has been identified. The cancelling of the remaining print job, and remaining copies, under prior art systems would mean that all of the copies would be counted as having been printed. However, pursuant to Applicant's invention, a more accurate count would be taken by monitoring the page count produced by processing circuitry 38 such that only the first copy would be counted, and the cancelled print job (and remaining copies) would not be counted. Therefore, a more accurate page count is produced by monitoring the page counts delivered by processing circuitry 38 as jobs are being delivered as output from an image forming device 12. Accordingly, a much more certain page count is generated than would be generated using prior art client PC-based software counters, such as are provided by Equitrac Corporation.

Detail Description Paragraph - DETX (15):

[0036] Device data file 40 also includes consumable usage information 36 comprising cost information for the total page area 44 and toner coverage 48 utilized by printing individual pages and/or print jobs. Accordingly, an image forming device 12, or printer, using tracking apparatus 10

of Applicant's invention can keep track of the costs incurred when printing a print job. More particularly, a user can keep track of the number of pages of paper that are utilized and the amount of toner that is utilized when generating a print job. Accordingly, the costs for generating such a print job can be passed on to the requestor of the print job, such as a client who has requested that work be done by a law firm utilizing such tracking apparatus 10. Similarly, a group of individuals can each be utilizing a dedicated client PC 18, and costs for print jobs can be tracked back to each specific individual client PC 18. In this manner, charges for submission and printing of print jobs can be correlated with specific users and/or requestors of print jobs that have been generated.

Detail Description Paragraph - DETX (18):

[0039] Tracking apparatus 10 of FIG. 2 collects consumables cost information by computing page-area cost and toner coverage via processing circuitry 38. More particularly, processing circuitry 38 implements an algorithm as shown in FIG. 3 which counts page-area 44 and toner coverage 46 and which is collected at image forming device 12 on a print job-by-print job basis. For example, where image forming device 12 is a printer, a print job is delivered to device 12 by a user, and processing circuitry 38 computes the number of pages, or page-area cost associated with generating the print job, as well as computing the toner coverage by counting the pixel coverage used to generate the print job. Accordingly, accurate cost information can be collected which details the total page-area 44 and total toner coverage 46 required for a specific print job. In this manner, the total cost is made available to

device 12 in the form of usage information 36. Such usage information 36 can then be associated with user information 34 and print job information 35, within device data file 40. Device data file 40 can furthermore be made available to a user via LAN 16, PC 18, servers 20 and 23, and controller 22.

Detail Description Paragraph - DETX (19):

[0040] Finally, tracking apparatus 10 can collect additional print job information that describes who submitted the print job, from where the print job originated, and when the print job was generated. Such information is trapped at the printer within device data file 40 which increases the veracity of the data that is collected within file 40 because the data is logically attached to a print job that is being processed by processing circuitry 38. Accordingly, there is less likelihood that inaccurate information will be attached to the usage information 36. Therefore, more accurate hard-copy cost recovery can be realized.

Detail Description Paragraph - DETX (20):

[0041] The ability for tracking apparatus 10 to provide the above data in a unified manner means that a more accurate determination can be made as to how many pages have been printed, what toner coverage has been used, who printed the print jobs, when have the print jobs been printed, where have the print jobs been printed, and more importantly, verification that a print job was completed so that costs can be accurately incurred and distributed to requestors of such print jobs and/or to users who have submitted such print jobs. In order to better understand implementation of Applicant's invention, two example cases are described below which detail

exemplary implementations of Applicant's invention according to the depiction of tracking apparatus 10 shown in FIG. 1.

Detail Description Paragraph - DETX (23):

[0043] Packet data identifying user 30 and the print job are trapped by the MFP firmware and sequestered on the MFP hard disk or memory 26. When the print job completes, the MFP 24 computes coverage and page area and joins this information to the trapped user/print job information. As print jobs arrive at the MFP 24, MFP 24 builds a data file of user/print job/cost information on its hard disk 26.

Detail Description Paragraph - DETX (24):

[0044] A resulting data file 40 (see FIG. 2) is a census result transaction data file where everything fused in MFP 24 gets counted. A census result transaction file comprising device data file 40 (of FIG. 2) is the raw material of true commercial-grade cost accounting information. For example, user information can be used to roll costs up into departments via a second user-to-department data table.

Detail Description Paragraph - DETX (25):

[0045] By trapping, joining, and co-opting LAN packets generated for other purposes, Applicant can build transaction data of high usefulness at a near-zero added cost to the image forming device and local area network.

Detail Description Paragraph - DETX (27):

[0046] A walk-up user 30 desires to make a duplex copy of a two-page, two-sided document. If the user interface 50 (of FIG. 2)

forces user 30 to  
log-in using a LAN-login-name and password, MFP 24 can then  
trap the user name  
and time from the data packets it is passing to and from  
the domain controller  
22.

Detail Description Paragraph - DETX (28):

[0047] Alternatively, a swipe card or smart card can be  
input by a user to  
smart card reader 56 (of FIG. 2) and be validated locally  
at MFP 24. In this  
case, user ID information can still be trapped, sequestered  
on disk or memory  
26, and merged with cost data upon job completion.

Detail Description Paragraph - DETX (30):

[0049] According to another aspect of Applicant's  
invention, a second key  
methodology is provided by tracking apparatus 10 wherein  
hybrid pull-push data  
gathering is implemented. More particularly, SNMP server  
20 on LAN 16 is used  
to poll image forming devices 12, such as MFP 24, in order  
to collect  
transaction details before the MFP's memory 26 overflows.  
If MFP 24 is not  
polled before an overflow event occurs with memory 26, MFP  
24 can be configured  
to push the transaction details through LAN 16 and to SNMP  
server 20 where such  
details can be stored on memory 28.

Detail Description Paragraph - DETX (31):

[0050] By combining the above two techniques illustrated  
in Example 2,  
transaction details of unprecedented veracity and  
usefulness can be realized  
via Applicant's invention, without imposing the costs of  
metering which result  
when utilizing competitive prior art technologies. For  
example, the  
utilization of most prior art cost recovery systems imposes  
significant costs  
in hardware and software which must be utilized in order to

meter the  
utilization of paper in an image forming device.

Detail Description Paragraph - DETX (32):

[0051] Accordingly, several advantages are provided by implementing Applicant's invention; namely, the need to install, debug and maintain software on a client's PC is eliminated. The ability to more precisely track cost is increased by eliminating the averaging of costs. Instead, costs can be taken directly from MIB entries of completed hard-copy events. Furthermore, by breaking pixels/toner usage and paper into separate categories of costs, a user can better automatically measure costs on a 100% pay-for-what-you-use basis.

Detail Description Paragraph - DETX (33):

[0052] Additionally, cost information can be piggybacked onto an existing local area network, thereby eliminating the need for secondary RS422/current loop communications, and reducing the likelihood that an invention will be tricked into miscounting consumable usage. For example, such tricking can occur when miscounting is realized by packet sniffing techniques. Additionally, where a sequestering/polling approach piggybacks with the existing domain login name security, validated user level information can typically be collected without forcing a user to enter and re-enter such data. The entry and re-entry typically occurs where a print/copy job is not submitted by a walk-up user. In many cases, this will eliminate the need for artificial accounting data collection systems, such as user code numbers, which otherwise need to be created.



Claims Text - CLTX (2):

1. An apparatus for tracking usage information for an image forming device, comprising: an image forming device; processing circuitry associated with the image forming device and operative to detect consumable usage information at the image forming device; and memory coupled with the processing circuitry and operative to store a data file containing the user information, the output job information, and the usage information.

Claims Text - CLTX (3):

2. The apparatus of claim 1 wherein the data file is a census transaction data file comprising cost accounting information of consumables utilized by the image forming device when generating output jobs.

Claims Text - CLTX (14):

13. The hard copy device of claim 10 wherein cost information is collected at the hard copy output device on a print-job-by-print-job basis.

Claims Text - CLTX (15):

14. The hard copy device of claim 10 wherein the hard copy output device increments page counts to obtain cost information.

Claims Text - CLTX (16):

15. The hard copy device of claim 10 further comprising an LDAP server and a local area network (LAN), wherein the LDAP server maintains user information and is operative to implement consumable cost recovery.